

MATHEMATICS

Curriculum Guide to Mathematics 10, 13, 20, 23

CURRICULUM GUIDE

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Acknowledgement

The Department of Education acknowledges with appreciation the contributions of the following members of the Mathematics 13, 23, 33 ad hoc Committee and the Mathematics 10, 20, 30, 31 ad hoc Committee to the preparation of this Curriculum Guide. These ad hoc committees have operated under the guidance of the Secondary School Mathematics Committee and the Secondary School Curriculum Board.

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NOTE:

This Curriculum Guide is a service publication only. The information is prescriptive only insofar as the content of the Guide duplicates that contained in the Program of Studies for Senior High Schools of Alberta. The Curriculum Guide contains, as well as content, methods of developing the concepts, suggestions for the use of teaching aids, and lists of additional reference material.

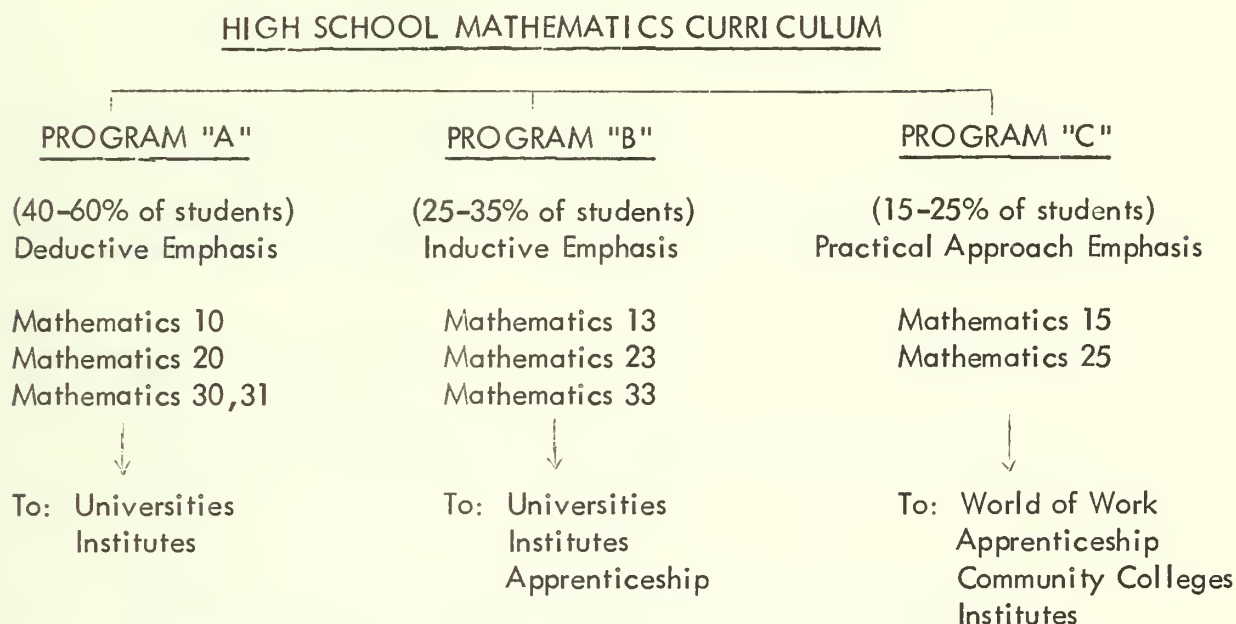
TABLE OF CONTENTS

	PAGE
ACKNOWLEDGEMENT	i
Committees	i
INTRODUCTION	1
The Senior High School Mathematics Curriculum	1
Objectives of Senior High School Mathematics Curriculum	3
MATHEMATICS 13, 23, 33	5
Specific Objectives	5
MATHEMATICS 13	7
Text and Course Outline	7
MATHEMATICS 23	9
Text and Course Outline	9
MATHEMATICS 10, 20	11
Texts and Other Materials	11
MATHEMATICS 10	13
Texts and Course Outline	13
MATHEMATICS 20	17
Texts and Course Outline	17
BIBLIOGRAPHY	21
General	21
Mathematics 13, 23	22
Mathematics 10, 20	23

Introduction

The Senior High School Mathematics Curriculum

The mathematics curriculum for Alberta high schools is designed for all students. To deal with differences in ability, interest and motivation, the curriculum in mathematics consists of three programs, each of which represents good mathematics. The following diagram illustrates the complete schema:



A discussion of the rationale of this type of organization is contained in a separate brochure.

Program "C" (Mathematics 15,25) was introduced in September, 1969. This curriculum guide relates to the introduction of Mathematics 10,20 in Program "A" and Mathematics 13,23 in Program "B". The new Grade Twelve course, Mathematics 33, and the revised Grade Twelve courses, Mathematics 30,31 will be introduced at a later date.

Certain trends in mathematics education are being reflected in each program, but most particularly in Programs "A" and "B". One of these is the attempt to integrate various strands of mathematics, such as Algebra, Geometry and Trigonometry into a single program. Modifications have been made to indicate the inter-relatedness of these various components. There is due emphasis, at the appropriate level, to the development of the structure of mathematics and to the introduction of conventional and precise symbolism and language. Stress on understanding precedes the development of skills and operation.

The guide outlines basically the required content. A suggested time allotment is provided for each chapter. There should be sufficient time to cover this content and to allow for testing, for enrichment and some exploration relevant to the interests of the pupils involved. The basic outline includes a few brief teaching notes gleaned from the experiences of teachers in the pilot courses.

Objectives of Senior High School Mathematics Curriculum

While the three programs of this curriculum have different specific objectives, the common general purposes of the Senior High School Mathematics curriculum may be stated as follows:

1 The Understanding of Mathematical Concepts

To develop an understanding of the main unifying ideas that make up the structure of mathematics.

2 The Development of Mathematical Skills

To develop and maintain those essential skills that support and augment mathematical concepts.

3 Problem-Solving Ability

To develop the ability to apply mathematical concepts and skills to the logical analysis and solution of problems.

4 Attention to Precision of Expression and to Modes of Reasoning

To develop precision in the use of mathematical symbols as a language of communication and to consider the nature of proof as represented by various reasoning modes.

5 Appreciation of the World of Mathematics

To develop an appreciation of the contribution of mathematics to the progress of civilization.

Mathematics 13, 23, 33

The specific objectives of this program are as follows:

- 1 To assist the student in the learning process by developing mathematical concepts by means of an inductive approach.
- 2 To use applications from various areas such as mensuration, science and the real world, for the purpose of reinforcing concepts.
- 3 To develop powers of analyzing problems and presenting solutions in a clear manner.
- 4 To develop and maintain an understanding of the operations and concepts of mathematics by using an essential core supplemented by exploratory topics.
- 5 To develop and maintain skill in mathematical operations by these means.

MATHEMATICS 13

Text: Dean, J.E., and W. Ronald Graham. PRINCIPLES OF MATHEMATICS, Book I.
Toronto: Holt, Rinehart and Winston of Canada Ltd., 1969.

Course Outline:

<u>Content</u>	<u>Periods</u>	<u>Text References Chapters</u>
<p>AN INTRODUCTION TO DESCRIPTIVE STATISTICS</p> <p>Definition, significance and relevance of statistics in modern society * Operations with significant digits and approximate numbers * Measures of central tendency * Applications</p> <p>a) This topic may be enriched through the use of current statistical materials that are available from many media.</p> <p>b) Certain topics have too few exercises to properly develop the concepts under discussion. Teachers should provide additional exercises for these areas.</p> <p>c) If calculators are available, they could be used advantageously in problems involving statistical data.</p>	10	1
<p>GEOMETRY: REVIEW OF FUNDAMENTAL IDEAS</p> <p>Angles * Congruency * Similarity * Polygons: areas, polygonal regions * Parallel lines * Pythagorean Theorem</p> <p>a) The ideas involved in discussion of similar triangles, may be developed and expanded through experimentation and by problems.</p>	20	2
<p>AN INTRODUCTION TO TRIGONOMETRY</p> <p>Triangle similarity; Pythagorean Theorem * Angle measurement * Trigonometric ratios * Applications</p> <p>a) This section presents an excellent opportunity to do field work.</p>	15	3

<u>Content</u>	<u>Periods</u>	<u>Text References Chapters</u>
ALGEBRA: REVIEW OF THE FUNDAMENTAL OPERATIONS WITH POLYNOMIALS Fundamental operations * Factoring * Applications	20	4
a) Algebraic examples should also be illustrated by arithmetical examples.		
ALGEBRA: RATIONAL EXPRESSIONS Fundamental operations	25	5
EXPONENTS, SCIENTIFIC NOTATION AND FORMULAE Laws of indices * Meaning of Zero and Negative Indices * Scientific Notation * Applications	10	6
THE REAL NUMBER PLANE: GRAPHS OF LINEAR RELATIONS IN TWO VARIABLES Ordered pairs of numbers * Rectangular co- ordinates * Cartesian products * Graphs * Systems of Two Linear Equations * Algebraic Solutions	25	7
a) Emphasize graphical solutions on the Real Number Plane of both Linear Equations and Inequations.		
RELATIONS AND VARIATION	<u>25</u>	8
	<u>150</u>	

MATHEMATICS 23

Text: Dean, J.E., and W. Ronald Graham. PRINCIPLES OF MATHEMATICS, Book II.
Toronto: Holt, Rinehart and Winston of Canada Ltd., 1969.

Course Outline:

<u>Content</u>	<u>Periods</u>	<u>Text References Chapters</u>
THE SET OF REAL NUMBERS Natural Numbers * Whole numbers * Integers * Rational Numbers * Operations in the Set of Rational Numbers * Irrational numbers * Real numbers	10	1
INDICES, RADICALS AND LOGARITHMS Review * Powers and Roots * Radicals * Operations with radicals * Logarithms * Applications a) Teachers should consider the possibility of introducing the Slide Rule, once the concept of logarithms has been established.	20	2
THE SLIDE RULE: A SECOND AID TO CALCULATION	15	3
QUADRATIC EQUATIONS Standard Form of a Quadratic Equation * Solutions of Quadratic Equations * Quadratic Formula * Problems * Applications	20	4
EQUATION SYSTEMS Linear inequalities * Linear programming * Flow charts * Linear Equations * Linear Systems * Quadratic equations a) There is an insufficient number of examples in text. See reference (D.C. Heath: THINKING WITH MATHEMATICS SERIES) for additional examples. b) The importance of graphical solutions to problems should be emphasized.	25	5

<u>Content</u>	<u>Periods</u>	<u>Text References Chapters</u>
GEOMETRY: PART I - INDUCTIVE	20	6
GEOMETRY: PART II - COORDINATE GEOMETRY		
Nomenclature of the circle * Circle relationships *		
Directed distances * Distance between two points *		
Shape * Midpoint of a line segment		
a) In the Geometry (Inductive Approach) be sure that students have time to carry out the experiments.		
ELEMENTARY PLANE TRIGONOMETRY	25	7
Review * Six basic trigonometric functions *		
Special and Quadrantal Angles * Graphs		
a) Use Logarithms and Slide Rule whenever possible.		
PROBABILITY	<u>15</u>	8
Definition * Mutually exclusive events *		
Independent Events * Dependent Events *	<u>150</u>	
Mathematical Expectation		
a) Emphasize the experimental approach whenever possible.		
b) Note references for additional problems.		

General Note:

Teachers should allow time for most of the work to be done in class. Evaluation techniques used should be based on observations of daily work and performance and with less emphasis on final examinations. Little emphasis on homework.

MATHEMATICS 10, 20

Texts:

- 1 Nichols, Eugene D., Ralph T. Heimer, E. Henry Garland.
MODERN INTERMEDIATE ALGEBRA, Revised Edition.
Toronto: Holt, Rinehart and Winston of Canada Ltd., 1969.
 - a) Students' Edition contains selected answers to questions.
 - b) Teachers' Edition contains: (i) Commentary For Teachers (suggestions for teaching - each chapter), (ii) Bibliography - for teachers, (iii) Solutions to questions.
- 2 Wilcox, Marie S., GEOMETRY, A MODERN APPROACH.
Don Mills: Addison-Wesley Publishing Company, 1968.
 - a) Students' Edition contains answers to selected exercises.
 - b) Teachers' Edition contains: (i) Bibliography - for teachers and students (with the title of each book is a short note explaining how the reference can be correlated with material in the text), (ii) Teaching suggestions.
 - c) Additional materials from Addison-Wesley:
 - (i) Solution Manual for GEOMETRY, A MODERN APPROACH
 - (ii) Overhead Transparency Masters for GEOMETRY, A MODERN APPROACH
 - (iii) Tests to accompany GEOMETRY, A MODERN APPROACH (Forms A & B)

MATHEMATICS 10

Texts: Nichols, Eugene D., Ralph T. Heimer and E. Henry Garland.
MODERN INTERMEDIATE ALGEBRA, Revised Edition.
Toronto: Holt, Rinehart and Winston of Canada Ltd., 1969.

Wilcox, Marie S. GEOMETRY, A MODERN APPROACH.
Don Mills: Addison-Wesley Publishing Company, 1968.

Course Outline:

A suggested time allotment is provided for each chapter in the courses. These time allotments are based on the regular forty-minute periods. For each course a total of 150 periods is suggested, or seventy-five periods in the semestered schools. This allows time for testing and for review, in addition to giving the teacher some flexibility in treating the various parts of the course.

<u>Content (Algebra)</u>	<u>Periods</u>	<u>Text References Chapters</u>
REAL NUMBERS, EQUATIONS, INEQUALITIES Natural numbers and integers * Rational numbers and decimal numerals * The system of real numbers * "Is equal to" and "is less than" * Density of rational numbers * Implication - a concept of logic * Truth-values of statements * Solution sets of equations and inequalities	15	1
EXPONENTS AND RADICALS Integer exponents * Properties of exponents * Square root * Rational number exponents * Radical equations * Scientific notation	10	*2

* In the Teacher's Edition of the text on page T-7, it is stated that "The concentrated form of presentation used in this chapter (Chapter 2) indicates that it is assumed to be a review, not an initial exposure." For our Alberta students, this is not quite so. They have had little practice working with exponents and have almost no background in the use of radicals. The teacher must supplement the work in this chapter.

<u>Content (Algebra)</u>	<u>Periods</u>	<u>Text References Chapters</u>
THE ALGEBRA OF POLYNOMIALS Polynomial form * Evaluation of polynomials * Addition * Subtraction * Multiplication * Special products * Factoring * Solving polynomial inequalities * Factoring over the rationals	20	3
THE ALGEBRA OF RATIONAL EXPRESSIONS Permissible values * Simplifying rational expressions * Multiplication * Division * Addition * Subtraction * Division of polynomials * Rational expressions in open sentences * Dimensional analysis * Complex rational expressions	15	4
COORDINATE GEOMETRY A coordinate system on a line * Segments * A co- ordinate system on a plane * Distance * Midpoints of segments * Slope * Parallel and perpendicular lines * Proofs using coordinate geometry * Equations that describe geometric conditions * Equations of circles * Equations of oblique lines	<u>20</u> <u>80</u>	5
<u>Content (Geometry)</u>	<u>Periods</u>	<u>Text References Chapters</u>
SETS This material may be covered rather quickly since the pupils have discussed most of the items in the junior high school.	5	1
RELATIONS Cartesian Products * Relations * Relations defined on a set * Equivalence relations * Relations defined on the set of real numbers	4	2
DEFINITIONS AND POSTULATES Definitions * Postulates * Subsets of a line * Angles * Measure of an angle * Perpendicular lines * Complementary and supplementary angles * Triangles * Congruent triangles	6	3

<u>Content (Geometry)</u>	<u>Periods</u>	<u>Text References Chapters</u>
PROOF Proof * Seeing is believing * Analogy * Induction * Valid conclusions * Deductive reasoning * Congruence as an equivalence relation * Congruence on the set of triangles	5	4
CONGRUENT TRIANGLES Theorems * Congruence postulates * Proofs * Equivalence relation on segments * Bisection * Congruence of right angles * Supplements of congruent angles * Vertical angles * Parts of congruent triangles	10	5
PROOFS USING CONGRUENT TRIANGLES Other uses of congruent triangles * Perpendicular lines * Isosceles and equilateral triangles * Triangles with two congruent angles * Proving theorems * Proof of theorems * Perpendicular bisectors of segments * Auxiliary lines * Perpen- dicular bisector proofs * Adding measures of segments and angles * Other uses of addition * Exterior angles of a triangle	15	6
PARALLEL LINES Indirect reasoning * Indirect proof * More indirect proofs * Parallel lines * Parallel postulate and parallel segments * Contrapositives * Converses * Angles and parallel lines * Measures of the angles of a triangle * S.A.A. congruence * Parallelism as an equivalence relation	15	7
QUADRILATERALS Quadrilaterals * Properties of parallelograms * Quadrilaterals that are parallelograms * Midpoints of sides * Rectangle, rhombus, and square * Right triangle theorem * Inequalities in triangles * Altitude of a triangle * Triangle inequality	<u>10</u> <u>70</u>	8

MATHEMATICS 20

Texts: Nichols, Eugene D., Ralph T. Heimer and E. Henry Garland.
MODERN INTERMEDIATE ALGEBRA, Revised Edition.
Toronto: Holt, Rinehart and Winston of Canada Ltd., 1969.

Wilcox, Marie S. GEOMETRY, A MODERN APPROACH
Don Mills: Addison-Wesley Publishing Company, 1968.

Course Outline:

The topics listed below should comprise the minimum course for Mathematics 20. It is suggested that some of the optional topics be included if time permits. Teachers should consult the Curriculum Guide for teaching suggestions and a list of teacher references.

<u>Content</u> (Algebra)	<u>Periods</u>	<u>Text References</u> <u>Chapters</u>
RELATIONS AND FUNCTIONS Inverse of a relation * Functional notation * Some special functions * Composition of functions * Inverse functions * Direct proportion * Inverse proportion	20	6
QUADRATIC FUNCTIONS Quadratic functions - different types * The general case * Completing the square * Applications	15	7
QUADRATIC EQUATIONS AND INEQUALITIES The Quadratic Formula * Properties of roots * Fractional equations * Radical equations * Quadratic patterns * Quadratic inequalities	15	8
COMPLEX NUMBER SYSTEM Extension of real numbers * Properties of addition * The additive identity and additive inverses * Subtraction * Properties of multiplication * The multiplicative identity and multiplicative inverses * Division * The complex number system as a field * Some complex numbers that behave like real numbers * Standard form * Absolute value * Conjugates * A geometric model for \mathbb{C} * Square roots which are complex numbers * Quadratic equations with complex solutions	Optional	9

<u>Content (Algebra)</u>	<u>Periods</u>	<u>Text References Chapters</u>
<p>SOLUTION SETS OF SYSTEMS</p> <p>Independent, inconsistent, and dependent systems * Solving systems by graphing * Equivalent systems * Comparison method * Substitution method * Addition method</p> <p>[Note: Omit – The Solution Set of a General System (p. 342) to the end of the chapter]</p>	10	10
<p>LOGARITHMIC FUNCTIONS</p> <p>Common logarithmic function * A log table * Log of a quotient * Log of powers * Scientific notation * Characteristic and mantissa * Approximating products, quotients, and powers * Approximating roots * Exponential equations * Other logarithmic functions * Change of base</p>	15	11
<p>TRIGONOMETRIC FUNCTIONS</p> <p>Paths * The unit circle and a coordinate system * The wrapping function "W" * Periodic functions * The cosine function * The sine function * The tangent function</p> <p>[Note: Omit – Trigonometric Equations (p. 422) to the end of the chapter]</p>	12	12
<p>APPLICATIONS OF TRIGONOMETRIC FUNCTIONS</p> <p>Degree-measure of any angle * Similar right triangles * Trigonometric ratios and degree- measure * Using the table of trigonometric function values * Solving right triangles * 30° -60° -90° triangles * 45° -45° -90° triangles</p> <p>[Note: Omit – Cosine, Sine and Tangent of Degree Measures (pp. 447-8-9), and The Law of Cosines, The Law of Sines (pp. 468-471)]</p>	13	13

<u>Content (Algebra)</u>	<u>Periods</u>	<u>Text References Chapters</u>
SEQUENCE S, SERIES AND LIMITS	<u>Optional</u>	14
Sequences and series * Arithmetic progressions *		
Arithmetic series * Geometric progressions *	<u>100</u>	
Geometric series * Summation notation * Infinite sequences and limits * Sum of an infinite series *		
Some special series		
<u>Content (Geometry)</u>	<u>Periods</u>	<u>Text References Chapters</u>
SPACE GEOMETRY	10	9
Lines and planes in space * Perpendicular lines and planes * Uniqueness of perpendiculars * Parallelism of lines and planes * Perpendicularity and parallelism *		
Distance in space * Dihedral angles		
RATIO, PROPORTION, SIMILARITY	10	10
Proportionality * Proportions * Similar triangles *		
Proportional segments postulate * Proving triangles similar * Similarity as an equivalence relation *		
Similar right triangles * Square root * Geometric mean * The Pythagorean Theorem		
POLYGONS; AREAS	10	11
Polygons * Convex polygons; Diagonals * Angles of a convex polygon * Exterior angles of a polygon *		
Area * Union of polygonal regions * Finding areas *		
Special areas * Trigonometry and areas * Regular polygons		
CIRCLES AND SPHERES	<u>20</u>	12
Circles and spheres: Definitions * Tangents to a circle *		
Chords * Tangent planes * Arcs of circles * Intercepted arcs * Arcs and chords * Angles and arcs * Angles with vertices not points of the circle * Points and circles *	<u>50</u>	
Power of a point		

BIBLIOGRAPHY

The number of books and articles on Mathematics meaningful to high school students and teachers of high school students is increasing rapidly. The following lists may focus your attention on some readings that relate to mathematics in general and in particular to each of the two programs.

General

Johnson, Donovan A. and Gerald R. Rising. GUIDELINES FOR TEACHING MATHEMATICS. Belmont, California: Wadsworth Publishing Company, Inc., 1967.

National Council of Teachers of Mathematics.

(i) EMERGING PRACTICES IN MATHEMATICS EDUCATION, Twenty-Fourth Yearbook, 1959.

(ii) EVALUATION IN MATHEMATICS, Twenty-Sixth Yearbook, 1961

(iii) ENRICHMENT MATHEMATICS FOR HIGH SCHOOL, Twenty-Eighth Yearbook, 1963.

Washington, D.C.: The N.C.T.M., 1201 16th Street NW

Polya, G. HOW TO SOLVE IT - A NEW ASPECT OF MATHEMATICAL METHOD
Garden City, N.Y.: Doubleday and Company, Inc., 1957.

THE MATHEMATICS TEACHER (eight issues per year). Washington, D.C.:
The N.C.T.M., 1201 16th Street NW

THINKING WITH MATHEMATICS SERIES

MATHEMATICS PROJECTS HANDBOOK, Adrien L. Hess

THE CONCEPT OF A FUNCTION, James D. Bristol

GRAPHING RELATIONS AND FUNCTIONS, James D. Bristol

AN INTRODUCTION TO LINEAR PROGRAMMING, James D. Bristol

THE NATURAL NUMBERS, Richard Spreckelmeyer

THE INTEGERS, Richard Spreckelmeyer

THE RATIONAL NUMBERS, Richard Spreckelmeyer

THE COMPLEX NUMBERS, Richard Spreckelmeyer

FINITE MATHEMATICAL STRUCTURES, John Yarnelle

AN INTRODUCTION TO TRANSFINITE MATHEMATICS, John Yarnelle

THE REAL NUMBERS, Richard Spreckelmeyer

Toronto: D.C. Heath, Canada, Suite 1408 - 100 Adelaide Street West.

Schaaf, William L. "The High School Mathematics Library". Washington, D.C.:
The N.C.T.M., 1201 16th Street NW

NOTE: The above references have extensive listings of books (teachers' and students'), of exhibits and displays, of teaching aids, of yearbooks, journals, pamphlets and newsletters.

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Attridge, Donald C., et al. A.S.T.C. MATHEMATICS.
Toronto: Ginn and Company, 1968.

Casey, John W., et al. MATHEMATICS 410.
Toronto: The Copp Clark Publishing Co., 1968.

Del Grande, J.J., et al. MECHANICAL AIDS TO COMPUTATION.
Toronto: W.J. Gage, Limited, 1969. (58 pp.)

Dodes, Irving Allen. MATHEMATICS - A LIBERAL ARTS APPROACH.
Don Mills, Ontario: (Hayden Book Co., Inc.) General Publishing
Co. Ltd., 30 Lesmill Road, 1965.

Dolciani, Mary P., et al. MODERN ALGEBRA - STRUCTURE AND METHOD.
Don Mills, Ontario: (Houghton Mifflin Co.) Thomas Nelson and Sons
(Canada) Ltd., 1963.

Hull, T.E., et al. AN INTRODUCTION TO ALGORITHMS.
Toronto: W. J. Gage, Limited, 1967. (pp.57)

Keedy, Mervin L. EXPLORING GEOMETRY.
Toronto: Holt, Rinehart and Winston of Canada Ltd., 1967.

Wiebe, Arthur J., and James E. Dean. FOUNDATIONS OF MATHEMATICS.
Toronto: Holt, Rinehart and Winston of Canada Ltd., 1965.

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- Del Grande, J.J., J.C. Egsgard, H.A. Mulligan. AN INTRODUCTION TO THE NATURE OF PROOF. Toronto: W.J. Gage Ltd., 1968.
- Del Grande, J.J., J.C. Egsgard, H.A. Mulligan. MATHEMATICS 10. Toronto: W.J. Gage Ltd, 1967.
- Del Grande, J.J., J.C. Egsgard. MATHEMATICS 11. Toronto: W.J. Gage Ltd., 1969.
- * Dolciani, Mary, S.L. Berman, W. Wooton. MODERN ALGEBRA AND TRIGONOMETRY, STRUCTURE AND METHOD, Book Two. Don Mills, Ontario: Thomas Nelson and Sons (Canada) Ltd., 1970.
- Elliott, H.A., R.G. Dunkley, N.J. Hill. CONTEMPORARY MATHEMATICS 5, GEOMETRY. Toronto: Holt, Rinehart and Winston of Canada Ltd., 1969.
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- Keedy, M.L., R.E. Jamieson, S.A. Smith, E. Mould. EXPLORING GEOMETRY. Toronto: Holt, Rinehart and Winston Inc., 1967.
- Moise, Edwin E. and Floyd L. Downs, Jr. GEOMETRY. Don Mills, Ontario: Addison-Wesley (Canada) Ltd., 1969.
- * Nichols, E.D., W. Palmer, J. Schacht. MODERN GEOMETRY. Toronto: Holt, Rinehart and Winston of Canada Ltd., 1968.
- Rosenburg, H., D.A. Johnson, J.J. Kinsella. GEOMETRY, A DIMENSIONAL APPROACH. Toronto: Collier-Macmillan, Canada, Ltd., 1968.

* These two texts are particularly good and will serve as excellent teacher references.

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A D D E N D U M

CURRICULUM GUIDE GRADE VII MATHEMATICS
(1965 Edition)

September, 1968

NOTE: Teachers familiar with the previous Grade VII Mathematics program will note that the information in this addendum means a decrease in the minimum program drawn from either the *Exploring Modern Mathematics* or the *Seeing Through Mathematics* text.

A. SCHEDULE OF UNITS AND MINIMUM PROGRAM FOR STUDENTS USING *EXPLORING MODERN MATHEMATICS, BOOK I*

(This section replaces the similar section on pages 8 and 9 of the 1965 Curriculum Guide for Grade 7 Mathematics.)

- a. The following approximate time schedule appears to be suitable for most students.

Chapter 1	3 weeks
Chapter 2	5 weeks
Chapter 3	3 weeks
Chapter 4	5 weeks
Chapter 5	4 weeks
Chapter 6	7 weeks
Chapter 7	5 weeks
Chapter 9	3 weeks

35 weeks

- b. Content that may be omitted for classes or individual students of moderate ability.

The sections listed below include those which are marked "Optional" in the textbook and those which teachers have found may be omitted for slow learners. Exercises identified with an asterisk (*) in the textbook are related to the "Optional" sections.

Chapter 1	Sections 1.4	
	1.5	Pages 16 to 31 inclusive
	1.6	and related review exercises
	1.7	on pages 32 and 33.
	1.8	
	1.9	
Chapter 4	As is on page 8. Page 9, after section 4.26	
	include: 4.27, page 172	
	4.28, page 173	
	Exercises page 173	
Chapter 5	As is on page 9.	
Chapter 8	Measures. Omit Completely.	
Chapter 9	Applying the Number System of Arithmetic.	
	Section 9.4	Let's Explore, pages 398 and 399
	9.5	Let's Explore, page 399
	Exercises page 399	

B. CONTENT THAT MAY BE OMITTED BY CLASSES OF INDIVIDUAL STUDENTS OF MODERATE ABILITY WHO ARE STUDYING *SEEING THROUGH MATHEMATICS*, BOOK I

(This section replaces the similar section on pages 18 and 19 of the September 1965, Grade VII Mathematics Curriculum Guide.)

NOTE: Exercises headed "Special Challenge", designed to challenge the most competent student, should be used for enrichment only for students well advanced in relation to the schedule of time. In assigning review exercises or exercises following a unit, part of which is omitted, teachers should exercise special care not to assign exercises that are related to content that has been omitted.

<u>Unit</u>	<u>Lesson</u>	<u>Content</u>
1	11	Sections A to D and displays 4 and 5, page 42; and sections E to M and displays 6 and 7, page 43.
2	28	Congruent triangles; displays 5 and 6 and exercises A through G on page 111.
3	38	Compound conditions for problems.
	39	Compound conditions for more complex problems.
	40	Conditions for abstract problems.
4	47	Problems involving compound conditions about rate pairs.
	48	Abstract problems involving rate pairs.
5	49	Tally, code, and grouping numeration systems.
	50	Numeration systems that have place value.
	51	Place value and digits in numeration systems.
	52	Egyptian, Roman and Babylonian numeration systems.

<u>Unit</u>	<u>Lesson</u>	<u>Content</u>
5	53	Sections A to M and display 5, page 228.
	54	Converting numerals from one base to another.
	55	Computing in numeration systems other than the decimal system.
	56	Sections A to F and displays 3, 4, and 5, page 239; sections G to M, page 240.
6		As is on page 19.
7	72	A proof for the reduction property of fractions: display 3 and exercises A through M on pages 313, 314.
	80	A proof for the commutative property of multiplication in the system of rational numbers of arithmetic: display 4 and exercises I through N on page 349.
	81	The associative properties.
	82	Omit all of pages 355, 356 and 357, sections E to H and display 10 on page 358, sections G to J and display 12 on page 359.
	83	The identity elements.
	93	Sections A to L and display 4 on page 406.
	95	Sections A to M and displays 4, 5 and 6, page 412; sections A to L on page 413.

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